2.2.2 History of Ecology

The expansion of industry and population surrounding the Site has resulted in a severe reduction in the availability of natural habitats for indigenous and migratory biota (Squires and Barclay 1990). Much of the city of Newark occupies land once dominated by salt marsh, which was filled with more than 21 million tons of material, including industrial and municipal wastes, dredge spoils, and railroad cinders (Zdepski 1992). The left shore of the Site, just upstream of the New Jersey Turnpike Bridge was once primarily marshlands (ERM 1992). Between 1873 and 1890, this area was extensively filled with 8 to 12 feet of mixed fill material from coal-gasification facilities, eliminating the marsh habitat and introducing a wide variety of chemicals to the environment (ERM 1992). By the early 1900s, the majority of salt marshes were filled with solid waste and pesticide application was routine in an effort to eliminate mosquito breeding areas (Zdepski 1992; Rod et al. 1989). A decline in bird diversity in the area is attributed to the destruction of marshlands and other natural habitats as a result of encroachment of human development and industrial activities on nesting and breeding grounds (Burger et al. 1993).

Populations of fish and shellfish in the Site and surrounding area have been substantially reduced by over-harvesting, loss of habitat, and pollution (Mytelka et al. 1981; Esser 1982; Franz 1982). A significant commercial fishery has not operated in Newark Bay or the Passaic River, including the Site, since the early 1900s (McCormick and Quinn 1975). As early as the Civil War, sales of oysters and shad were affected by reports that the organisms were tainted with coal oil and **?**off flavors" (Earll 1887; Squires 1981). The Commission of Fisheries of New Jersey reported in 1885 that water-borne pollution was resulting in declining fish populations in the Passaic River (Esser 1982). After the turn of the century, conditions apparently deteriorated rapidly until 1926, when a survey conducted in the area by the US War Department found **?**fish life destroyed" (Hurley 1992).

Based on the results of monitoring and research undertaken since the mid-1970s, the State of New Jersey has taken a number of steps, in the form of consumption advisories, closures, and sales bans, to limit the exposure of the fish-eating public to toxic contaminants in the Passaic River Study Area. The initial measures prohibited the sale, and advised against the consumption, of several species of fish and eel and was based on the presence of PCB contamination in the seafood. The discovery of widespread dioxin contamination in the Newark Bay Complex led the State of New Jersey to issue a number of Administrative Orders in 1983 and 1984 which prohibited the sale or consumption of all fish, shellfish, and crustaceans from portions of the Passaic River including the Passaic River Study Area. These State fish advisories and prohibitions are still in effect.

Recent studies of the lower Passaic River and Site report the presence of some fish and benthos known to be highly tolerant of reduced dissolved oxygen conditions, implying the presence of a stressed aquatic system (Festa and Toth 1976; Santoro et al. 1980; Princeton Aqua Science 1982). Depressed levels of dissolved oxygen have been known to be a chronic problem in Newark Bay and its tributaries since the early 1900s (McCormick et al. 1983). Investigations conducted prior to 1940 by the Interstate Sanitation Commission (ISC) indicated substantially decreased levels of dissolved oxygen (DO) throughout the region during the early part of the century (ISC 1939). A survey of benthic organisms conducted in the Site in 1981 indicated that the benthic macroinvertebrate community was limited to those species capable of surviving extremely poor water quality conditions (Princeton Aqua Science 1982). Available studies of sediment and water quality indicate that pollution control measures and the reduction or control of other environmental stressors have produced a gradual improvement in the ecosystem over the past two decades.

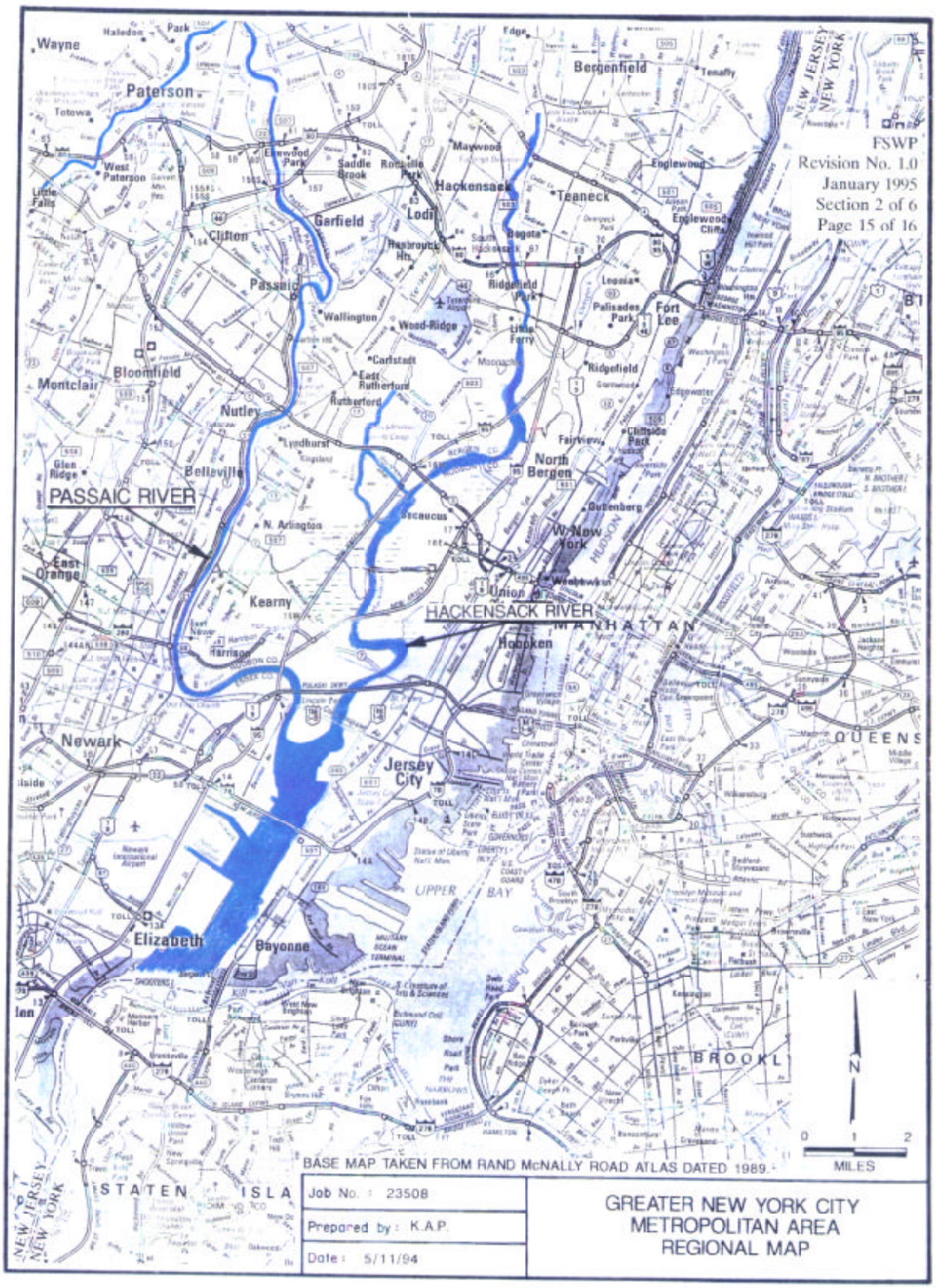
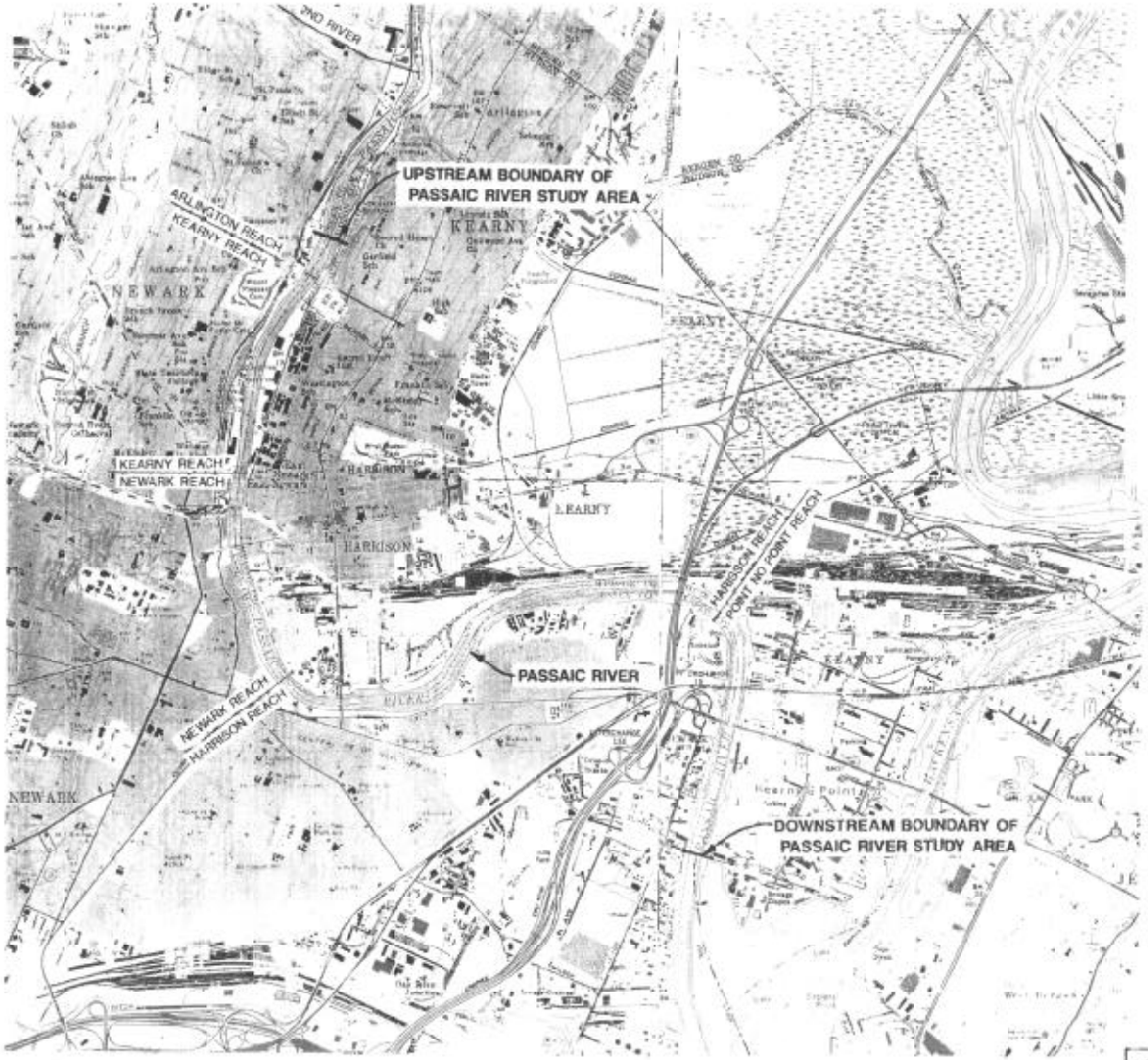
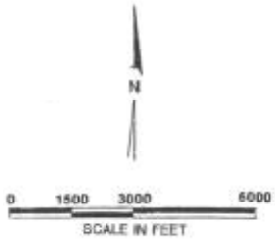


FIG. 2-1





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PASSAIC RIVER
STUDY AREA LOCATION MAP

FIG. 2-2

3.0
IDENTIFICATION OF DATA USES AND NEEDS

This section presents the general data requirements for conducting the FS.

General categories of data needed for the FS are as follows:

- geology and hydrogeology
- topographic survey
- bathymetric survey
- physical/geotechnical parameters of sediments
- chemical analysis of sediments
- human and ecological exposure pathways and endpoints
- river hydrology
- treatability data (if needed)
- available utilities (gas, water, electricity, etc.)
- land use

The general data needs described above will be fulfilled by the Remedial Investigation, the Human and Ecological Risk Assessment (HERA), and information gathered during implementation of the FS.

Chemical and exposure pathway or endpoint data will be used in developing the remedial action objectives for the Site. The data which describe the physical characteristics of the sediment and the Site, in addition to the chemical data, will be used to identify and screen remedial technologies and process options, and assemble and screen alternatives. Although no data gaps have yet been identified, additional data may need to be collected to conduct the detailed analysis of alternatives.